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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

LAMB, BRENDA A

ART UNIT	PAPER NUMBER
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1792

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/539,968	Applicant(s) DECRE ET AL.	
	Examiner Brenda A. Lamb	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 5/11/2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 12-22 is/are pending in the application.
- 4a) Of the above claim(s) 20-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 12-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Newly submitted claims 20-22 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the omission of electrode or electrodes from the system for manipulation of the object which includes having carrier comprised of a first carrier portion joined by a flexible joint to a second carrier portion such as set forth in newly presented claim 20 is independent and distinct from the originally claimed invention which requires electrowetting or use of electrodes to influence the wetting process and movement of the object between a first and second carrier portion in the system. The omission of electrode or electrodes from the system for manipulation of the object which includes a detector that is configured to distinguish fluid droplets carrying one the plurality of droplets from fluid droplets that are not carrying one the plurality of droplets from fluid droplets such as set forth in newly presented claims 21-22 is independent and distinct from the originally claimed invention which requires electrowetting or use of electrodes to influence the wetting process and orientation of the object in the system.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 20-22 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 5,7 and 18-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The recitation in newly amended claim 5 and newly presented claim 18 that ratio of size of a single fluid droplet to size of a single object is indefinite since it unclear what dimension of the droplet (height or width) relates to which dimension of the object (height, width or length). It is suggested that applicant amend claims 5 and 18 as follows to overcome the rejection under 35 USC 112, second paragraph: at line 2 of claim 5 and at line 8 of claim 18 after "ratio of size of the" insert -- thickness of the --; at line 2 of claim 5 and at line 8 of claim 18 after "fluid droplet to the size of the" insert – width of the –. The term "the substrate electrodes" in claim 7 lacks proper antecedent basis.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-7 and 12-19 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for system for manipulation of transporting electronic components in fabrication of semiconductor devices having a dimension within the range of 20-500 μm , does not reasonably provide enablement for the fluid droplet having surface tension to carry an object which broadly reads on a diverse variety of objects being carried by a fluid droplet or does not reasonably provide enablement for the fluid droplet having surface tension to lift an object which broadly reads on a diverse variety of objects being lifted by a fluid droplet. The specification

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does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

The examiner maintains the rejection of newly amended claims 1-7 and 12-17 and asserts rejection of newly presented claims 18-19 for the following reasons: the term "object" reads on a variety of elements which differ in size and density and a fluid droplet may have sufficient surface tension to carry or lift a metal powder particle but not sufficient to carry or lift the same metal in the form of a large diameter metal nugget.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4, 6-7, 12-13 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shenderov 6,773,566 in view of Shenderov 6,526,727.

Shenderov '566 teaches the design of a system for manipulation of a small object which broadly would encompass the reactive material at reactive site 35. Shenderov teaches a substrate or top plate 26 on its lower surface receives a small object 35. Shenderov '566 teaches a carrier which transports or moves the small object by using droplet manipulation electrodes 22a. Shenderov '566 teaches that the fluid droplet couples/binds constituents of the small object to the carrier as the droplet moves downwardly from the upper chamber 27 to the lower chamber 23 (see column 7 lines 41-58). Shenderov '566 fails to teach the carrier and/or substrate is provided with at least electrode having a shape selected to influence an orientation of the small object with respect to at least one of the carrier and substrate and electrode is shaped so it corresponds with the shape of the object. However, Shenderov '727 teaches that his electrowetting system in which an electrode potential is applied to a configuration of electrodes to convert and define hydrophilic regions that move and re-position such droplets within the system so as to from a liquid configuration similar to that of the electrodes configuration and such electrodes configurations are known to vary as shown in Figures 6-8. Therefore, given Shenderov '727 teaching that in electrowetting system that electrodes with a particular configuration are provided and an electropotential provided to these electrodes influence the shape of the droplet, it would have been obvious to modify the Shenderov '566 system by providing the substrate electrode with a shape/configuration so as to influence the shape of the droplet along with the object arranged thereon as well as orientation of the object itself in order for the

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combination (the fluid droplet along with object) to be completely wetted on the electrode thereby enabling for the efficient transport thereof. Thus claims 1 and 7 are obvious over the above cited references. With respect to claims 2-3, Shenderov '566 teaches that the droplet can be disposed on the carrier or on the substrate dependent on activation of the electrodes within the system. With respect to claim 4, Shenderov '566 teaches that the fluid droplet is arranged on the substrate in particular positions dependent on activation of the electrodes (see column 7 lines 43-58). With respect to claims 6 and 12, Shenderov '566 teaches the carrier and substrate are each provided with an electrode. Senderov '566 shows that the carrier and substrate are provided with a fluid droplet. With respect to claim 13, Senderov '566 teaches that the system is configured to a transfer the small object between the carrier and the substrate by activating the substrate electrode when the small object contacts the fluid droplet on the substrate. Senderov '566 teaches transferring the droplet from the carrier to the substrate occurs by applying opposite charges to the substrate upper electrode and carrier lower electrode and to reverse the charge of the carrier lower electrode one would need to deactivate the carrier electrode. With respect to claim 17, Senderov '566 shows in Figure 4 that the droplet that may carry an object may be lifted upward.

Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morf, WO02/063678 (hereafter referred to as Morf) in view Tsuruta et al 4,507,383.

Morf teaches a system for manipulation of an object or integrated circuit element comprising the following elements: a carrier to transport the small object (element transfer holder, 4, see Figure 1 and Abstract), a substrate to receive the small object (target substrate, 2, see Figure 2 and Abstract), and a fluid droplet which couples the small object detachably to the carrier and/or to the substrate (adhesive layer, 8, and liquid droplet, 9, see Figures 1 and 2 and Abstract). Morf teaches the system substantially as claimed but fails to indicate the optimum ratio between the sizes of the droplet and object. However, Morf does teach that the patterning of predetermined hydrophilic locations for the target liquid droplets advantageously effects an automatic limitation of the liquid amount contained in the droplet (Page 4 line 23 - Page 5 line 1). He therefore indicates that this is recognized as an important parameter to limit.

Tsuruta et al teach that the ratio of adhesive thickness to adhered particle diameter is optimally between 0.2 and 0.4, overlapping with the instantly claimed range.

It is taught that this ratio provides particles that are adhered without having excess adhesive seep up and around the particles (Tsuruta et al at column 3 lines 9-19).

It would have been obvious to those of ordinary skill in the art at the time of the invention that the ratio taught by Tsuruta et al could be applied to the system of Morf because both are dealing with adhering objects on the scale of a micron to a thin layer of liquid. One would have sought out appropriate limits of the amount of liquid to apply as suggested by Morf. Further, one would have been motivated to combine these references and arrive at the present invention in order to determine if the benefit of decreased excess liquid, as taught by Tsuruta et al, could allow the reversible binding

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and accelerated liquid evaporation, as required by Morf. With respect to claim 19, Morf shows in his figures a plurality of objects each of which is detachably coupled to a respective one of a plurality of droplets.

Applicant's arguments filed 5/11/2009 have been fully considered but they are not persuasive.

Applicant's argument that Shenderov '727 (secondary reference) fails to teach the system is suitable for the detachably coupling of the object and clearly not capable of doing so due to the formation of the chamber by the top and bottom wafers is found to be non-persuasive. To further clarify the rejection in the last office action, the examiner notes that Shenderov '727 in Figure 2 shows that in electrowetting that the droplet wets the electrode and has shape of the droplet is influenced by the shape of the electrode as inferred by the cross-sectional outline of the droplet which is noted by the examiner to be similar in shape to the electrode. Therefore, given Shenderov '727 showing that in his electrowetting system that the shape of droplet which wets the electrode is similar in cross-sectional outline to the electrode, it would have been obvious in the Shenderov '566 system to provide its electrode with a shape/configuration similar to or corresponding to the combination of object with fluid droplet coupled together which is being manipulated through the system in order for the combination (object along with the fluid droplet) to be completely wetted on the electrode thereby enabling for the efficient transport thereof.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brenda A. Lamb whose telephone number is (571) 272-1231. The examiner can normally be reached on Monday-Tuesday and Thursday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton, can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

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Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Brenda A Lamb
Primary Examiner
Art Unit 1792

/Brenda A Lamb/

Primary Examiner, Art Unit 1792